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ABSTRACT

Many school staff and their client communities are concerned about pupil achievement, skills, and attitudes related to science. To respond to these concerns, staff need to determine how they can improve their science programs by modifying the content and skills emphasized in the curriculum, changing and supplementing instructional materials, changing instructional approaches, and changing the use of technology. This digest discusses publications and sources of information on exemplary programs from several states and national organizations. Highlighted are efforts of the National Diffusion Network (NDN), the National Science Foundation (NSF), the Educational Products Information Exchange (EPIE), Regional Educational Laboratories, The Educational Resources Information Center (ERIC), the COSMOS Corporation, the Department of Education, and the National Science Teachers Association (NSTA). A list of information sources and 14 references are included. (CW)

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SOURCES OF INFORMATION ABOUT PROMISING AND EXEMPLARY PROGRAMS AND MATERIALS FOR ELEMENTARY SCHOOL SCIENCE

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SOURCES OF INFORMATION ABOUT PROMISING AND EXEMPLARY PROGRAMS AND MATERIALS FOR ELEMENTARY SCHOOL SCIENCE

Many school staff and their client communities are concerned about pupil achievement, skills, and attitudes related to science. To respond to these concerns, staff need to determine how they can improve their science programs by modifying the content and skills emphasized in the curriculum, changing or supplementing instructional materials, changing instructional approaches, and changing the use of technology.

What should be included in an elementary school science program?

There are several publications available to use to determine what a science program should include. Several states including California, Michigan, and New York have produced state guides or frameworks suggesting what should be included in a good elementary school science program.

The American Association for the Advancement of Science (AAAS) has launched Project 2061, an ambitious project outlining content to be included in K-12 school programs. The National Science Teachers Association (NSTA) is developing a project to modify the scope and sequence of K-12 science.

In addition to the state and national frameworks there are guidelines for elementary school science produced by other groups including the National Center for Improving Science Education (1989).

What materials are available that have been evaluated for their impact on student performance?

The National Diffusion Network (NDN)

The NDN provides funds to disseminate exemplary programs and materials. Before a program can be included in the NDN program, it must be approved by a review group, the Program Effectiveness Panel. A program requesting a review must provide evaluation data that indicate the program was effective in the school in which it was developed or field tested and that it could be used successfully in other schools.

Programs or materials that are judged effective are summarized in the Department of Education publication *Education Programs That Work* (Education Programs..., 1988); updated editions are produced periodically. Elementary science programs in *Science Education Programs That Work*, (1989) include "Conservation for Children," "Ecology," "Foundational Approaches in Science Teaching (FAST)," "Hands-on Elementary Science," "Informal Science Study (IFSS)," "Life Lab Science Program," "Marine Science Project: for SEA," "Starwalk," and "ZOO."

The National Science Foundation (NSF)

The National Science Foundation is providing support for the development of several elementary and middle school programs. All materials developed go through trials with pupils before they are released for use by schools. Among the projects being supported are the following: (1) The Life Lab Science Program, a cooperative effort of Life Lab Science Program, Inc. and Addison-Wesley Publishing Company; (2) The Science Connection, a cooperative project of the Houston Museum of Natural Science and Silver, Burdett and Ginn Publishing Company; (3) Super Science: A Mass Media Program, a cooperative effort of Scholastic, Inc. and several school districts: (4) Full Option Science System (FOSS), a cooperative project of the Lawrence Hall of Science and Ohaus Scale Corporation; (5) National; Geographic Kids Network Project, a cooperative project of the Technical Education Research Center, Inc. and the National Geographic Society; (6) Science for Life and Living: Integrating Science, Technology, and Health, a cooperative project of the Biological Sciences Curriculum Study, Kendall/Hunt Publishing Company, and others; and (7) Improving Urban Elementary Science: A Collaborative Approach, a cooperative activity of the Education Development Center, Inc. and six cities.

What are other sources of programs and materials with evaluation data?

The Educational Products Information Exchange (EPIE) is a non-profit organization that reviews and evaluates educational materials. EPIE produces a newsletter and special publications that include evaluation information on a variety of curriculum materials including science. A listing of EPIE materials can be obtained by writing to EPIE.

Some of the Regional Educational Laboratories sponsored by the U.S. Department of Education produce and/or review science materials. The Northwest Regional Educational Laboratory, for example, reviews and evaluates computer software, including those related to science. They publish the results of their reviews on a regular basis.

States such as New York produce science materials for schools that have had extensive evaluation. Some states such as California and Texas publish reviews of textbooks.

The ERIC database contains materials, descriptions of programs, and evaluation data related to many programs.

What are sources of information about promising programs and materials?

Some programs and materials have been found to be effective for improving learning, but have not been reviewed on a formal basis by an outside organization or agency. Based on their use and the reported results, they are considered promising programs and materials and worthy of consideration by others.

The COSMOS Corporation (White, 1986) worked with the National Science Teachers Association and other groups to identify programs and materials that were considered effective. The catalog published in 1986 contains more than 40 descriptions of programs, materials, and practices for elementary school science.

The Title II program of the Education for Economic Security Act has supported the development of promising programs and materials. A recent document published by the United States Department of Education contains over 80 project summaries from projects funded in 39 states and the District of Columbia (Exemplary Projects. Mathematics-Science..., 1988). The subject areas covered in these projects include several elementary school science projects.

The National Science Teachers Association (NSTA) inaugurated the Search for Excellence in Science Education in 1982 to carry out the National Science Foundation's 1981 initiative, Project Synthesis. A committee established criteria for excellence and applied them to actual science programs. Twelve elementary school science programs were identified and described in Volume 1, Number 2 of the Focus on Excellence series (Penick, 1983). Additional programs have been identified and described in other publications. Middle school programs were identified in a 1985 NSTA publication edited by Penick and Krajcik.

Elementary school science programs and materials are also being developed with funds from the U.S. Department of Education Eisenhower Act. *The Abstracts of the 1989 and 1988 Awards: Dwight D. Eisenhower Mathematics and Science National Programs* (Levinson, 1989) includes elementary programs with science components.

There are a variety of programs and materials available that make use of new technology. Software has been and is being developed for elementary school programs. Integrated learning systems have been developed for elementary school science. Distance learning programs (including the STAR School Project) also include materials for elementary school science education. *Linking for Learning* and *Online: Computers in Education* describe several examples.

The ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/SMEAC) has contacted (1) state, county, and local coordinators and curriculum specialists for science and (2) federal program staff for nominations of programs and materials they consider promising and exemplary. In addition, association programs, newsletters, journals, and materials received at ERIC/SMEAC have been reviewed for programs and materials.

From these sources, possible programs and materials have been and are being identified and schools and projects involved with these activities are being contacted to obtain information about the programs and materials and actual materials when available. A description of a selection of the programs and materials related to elementary school science will be published in 1990.

ERIC/SMEAC plans to produce supplements to the 1990 publication when additional programs and materials are identified. Nominations for programs and materials should be sent to ERIC/SMEAC.

What are some good ways to begin?

Some sources of information and publications that include programs and materials described in this digest are listed. In addition, you should contact your state coordinator or specialist in science education; many states have started reform activities and you should determine what your state and schools in your state are doing and resources that are available.

Selected Information Sources

National Science Foundation
Division of Materials Development,
Research and Informal Science Education
1800 G Street, NW
Washington, DC 20550

Northwest Regional Laboratory
101 Southwest Main Street
Portland, OR 97204

National Diffusion Network
555 New Jersey Avenue, NW
Washington, DC 20208-1525

EPIE Institute
P.O. Box 839
Water Mill, NY 11976

SELECTED REFERENCES

NSTA items can be obtained directly from the National Science Teachers Association (NSTA), for the price indicated, at the following address:

NATIONAL SCIENCE TEACHERS ASSOCIATION
1742 Connecticut Avenue, NW
Washington, DC 20009
Telephone: 202-328-5800

Criteria for Excellence. An NSTA Science Compact. National Science Teachers Association,Washington, DC, 1987. ED 280 739. NSTA price $4.00.

Directory of Awards. Fiscal Year 1987 and 1988. National Science Foundation, Washington, DC, 1989. ED 309 026.

Education Programs That Work: A Collection of Proven Exemplary Educational Programs and Practices. Edition 14. Sopris West Incorporated, Longmont, CO,1988. ED 296 984.

Exemplary Projects. Mathematics-Science, Computer Learning and Foreign Languages. A Collection of Projects Funded through Title II of The Education for Economic Security Act. Department of Education,Washington, DC,1988. ED 302 390.

Glass, Lynn W., ed. *Focus on Excellence: Energy Education*. National Science Teachers Association, Washington, DC, 1985. NSTA price $7.00.

Levinson, Luna Lambert, ed. *Abstracts of the 1989 and 1988 Awards: Dwight D. Eisenhower Mathematics and Science National Programs*. Office of Educational Research and Improvement, U.S. Department of Education,Washington, DC,1989. SE 051 024.

Linking for Learning.Office of Technology Assessment, Washington, DC, 1989.

National School Boards Association. *OnLine: Computers in Education. What's Happening? What's Possible?* Jostens Learning Corporation, San Diego, CA, 1989.

Penick, John E., ed. *Focus on Excellence: Elementary Science Volume 1, Number 2*. National Science Teachers Association,Washington, DC, 1983. ED 243 689. NSTA price $7.00.

Penick, John E., ed. *Focus on Excellence: Elementary Science Revisited*. National Science Teachers Association,Washington, DC, 1988.

Science and Technology Education for the Elementary Years: Frameworks for Curriculum and Instruction. Center for Improving Science Education, Washington, DC, 1989.

Science Education Programs That Work. A Collection of Proven Exemplary Educational Programs and Practices in the National Diffusion Network. Office of Educational Research and Improvement. U.S. Department of Education,Washington, DC, September, 1989.

Science for All Americans. American Association for the Advancement of Science, Washington, DC, 1989.

White, J. Lynne, ed. *Catalogue of Practices in Science and Mathematics Education*. COSMOS Corp.,Washington, DC, 1986.

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